

The Journal of the
MUSEUM OF
COMPARATIVE
O O L O G Y



Santa Barbara, California

1920

The coöperation of Members and well-wishers, therefore, is especially needed and desired during this unexpectedly prolonged period of preparation and accumulation. The change only means that for the time being the local funds hitherto devoted to field work will be turned into another channel, and that the exchange program will be suspended until the return of Mr. Dawson from his accomplished task. As evidence of our own good faith, we are publishing the "Journal" without a subscription list, and are proposing to our esteemed members and correspondents a donation-subscription of material in lieu of annual fees.

THE QUESTIONNAIRE.

During the winter past the M. C. O. put out a "questionnaire," addressed to oölogists both home and foreign, and soliciting information oölogical and biographical for use in our files. While some valuable data have been submitted in response to this invitation, we cannot claim that the experiment so far has been an unqualified success. Evidently, we have bungled somewhere. For one thing, we neglected to enclose return postage. This was not an oversight exactly (we addressed these questionnaires only to those who had already received a copy of the "Journal," with our compliments) but it was a mistake. We admit it sorrowfully.

And again we were unfortunate in having too many rivals in the field, some whose presence filled the mind with foreboding. There was the Draft Questionnaire, a stupendous document, before which the stoutest heart quailed. "Do I have to fill out that thing? But I don't want exemption." No matter if you were ready to pour out your life blood upon the spot for your country, you had to go through the documentary grill first. And there is the Income Tax Return burrowing into your vitals more familiarly than your trusted family physician! "What! another questionnaire? Away with it!" And this is the year of the Census. We have rehearsed our family circumstances patiently to a casual stranger and we had supposed that our patriotic duties were done. "Another! Really, you must excuse me!"

Well, the joke is on us; but now that we have all had a laugh about it, the M. C. O. ventures, most humbly, to repeat its request for **information**. The census returns have been made; the tax inquisition is over for this year; the war is past; and the issue before the house is that of **increased coöperation** among oölogists. The returns that have come in are mighty interesting to us. They would be to you. Wouldn't you like to know, for instance, who has the largest private collection in America? Whom do you think? We know; but we "dassent" tell—out loud. Isn't it a matter of congratulation that Col. E. C. Stuart has 40,000 eggs representing 2000 species and subspecies of Indian birds? Or that Wm. Mark Pybus, Esq., has authentic eggs of the Eskimo Curlew? We know pretty much who are in the 900 class (a very few, by the way), and we are permitted to tell Members of the M. C. O. Messrs. Bent and Harlow, for example, are in the "800" class. How many more are there? But, of course, mere numbers are not the object sought in collecting eggs, nor rarities even. **Completeness within a chosen field** is probably the highest object which the private collector sets before himself, and it would be interesting and **profitable** to know just what everybody's specialties are.

Some of our correspondents, and these almost without exception the more eminent ones, have answered every question with painstaking accuracy. Our sincerest thanks are due them for this courtesy, and we anticipate the pleasantest of relations based on such frankness. We have given the questionnaire the "once over" and the results are valuable as far as they go. We beg those who have put this matter by, or who have hesitated to commit themselves, as well as those who have merely neglected it, to send in full answers at early convenience, or to notify us so that we may send them new blanks.

The Case of the Santa Cruz Island Jay, *Aphelocoma insularis* Hensh.

AN EXAMPLE IN COMPARATIVE OOLOGY.

One of the prime objects of the study of comparative oology is the determination of values in what we may call Comparative Genology. By genology we mean a study of the vital characters which distinguish species, a study of geno-dynamic values, as distinguished from structural characters, habits, psychology, etc. A geno-dynamic appraisal to be of any value must involve a pretty thorough knowledge of the present status of a given species, its distribution, its associations, its reactions with other



Portrait of Santa Cruz Island Jay, *Aphelocoma insularis*
By W. Leon Dawson

species, and especially, its adaptability to changing environment. Such an appraisal presupposes a considerable knowledge of taxonomic relationships, or more exactly, of phylogeny; and it is, in short, a sort of epitome of racial history from the value standpoint. More particularly, then, the task of genology, or geno-dynamics, is to estimate the relative **value** of a species, and to express that value in terms of energy and achievement, noting in each case, direction of development, rate of developmental progress, degree of success or failure, mobility, adaptability, and the like.

Without presuming to answer all the questions raised by this hurried definition of a science (the discussion of whose set terms I shall now dismiss), I wish to point out some "geno-dynamic" values which are indicated by a comparison of the eggs of *Aphelocoma californica* (Vigors) and *Aphelocoma insularis* Henshaw. Whether or not one follows a recent authority (Oberholser) in recombining the western mainland jays of the *Aphelocoma* type, *californica*, *woodhousei*, and the like, as one species, it is enough for our purpose to note the existence in California of a mainland *Aphelocoma* jay, *A. californica*, only slightly, if at all, differentiated by somatic characters (subspecies *immanis* claimed by Grinnell and *oöcleptica* by Swarth). We note further that this substantially uniform species is characterized, apparently throughout its range, by a high degree of variation in respect to its eggs. This variation is so great that it has given rise to two well-recognized types, the "red" and the "green," with every combination or intergradation between these extremes. It is not necessary for our purposes to describe these variations minutely, but the reader is referred for illustration to the colored frontispiece in this number. So far as ascertained, this variation, however derived, observes the well-known Mendelian laws, and the strains thus indicated exist quite independently of local or environmental conditions. Whatever else this set of facts may mean, it probably indicates an active, mobile, virile, or dominant, type of bird. The recurrence of eggs, for example, of the "red" type in widely sundered localities does not indicate the presence of a "race" of jays of wide distribution and still imperfectly amalgamated with a hypothetical race laying green eggs. It denotes rather the ancient and long established presence of a certain tendency to vary inherent in the reproductive stream, transmissible both in general and in particular by heredity (i. e., breeding true to type), but existing in utter independence of somatic change (i. e., variation in the individual bird, the individual being the contem-

poraneous but not necessarily the correlated exemplar of the species concept). This tendency to vary, which is manifest in the egg, might conceivably, indeed would in all probability, reflect itself racially (or somatically) under selective breeding, which in the case of the California Jay has marvelously preserved the uniformity of the species.

There exists upon the Island of Santa Cruz, some twenty-five miles distant from the mainland at Santa Barbara, a Jay, *Aphelocoma insularis*, which is almost an exact replica of the mainland bird, *A. californica*, in color and pattern of plumage, but which has undergone certain important modifications of proportion, especially of beak and feet. While the wing and tail measurements of the island bird average only from ten to twenty per cent longer than those of the mainland type, the bill will sometimes bulk nearly twice as large, and the feet and tarsi will probably show a fifty per cent increase in bulk. The Santa Cruz Island Jay enjoys a fairly uniform distribution within its narrow range, an area twenty-five miles long by eight wide at the widest point; and because it is a vigorous, dominant form upon the island, is probably maintained at the saturation point of some 2000 or 3000 pairs.

As in the case of any other insular species, questions arise as to the presence of this jay on Santa Cruz Island. How did it get here? How long has it been here? What was the size of the original colony? Has there been an infusion of new blood from time to time derived from the mainland? or has there ever been such infusion? These are very natural and very interesting questions, but their answer is quite beyond the power of the anatomist. The "skin-man" is silent. He has no criteria beyond that of somatic change in one direction, i.e., increase in size, to guide him. He is destitute of the knowledge of any other factor by which he may check up or correlate his guesses.

Naturally, the taxonomist turns to the geologist. He is able to help out sometimes, but his answers are apt to be a little vague. For how long a period has Santa Cruz Island been separated from the mainland of California? "A hundred thousand years," says Mr. John R. Pemberton, who has done a great deal of topographic work for the U. S. Geological Survey in this section. That is a generous allowance, more than ample to account for this increase of the bird's bulk. But are there any other possibilities besides this of original occupancy by which this semi-distant island might have been stocked? Yes, three at least; and in naming them we shall rule out of present consideration the "obvious," but also impossible, hypothesis of flight. The wings of a jay, whether *insularis* or *californica*, are too short and weak to permit of its attempting a sheer flight of twenty-five miles. The jays of Santa Cruz, if not actually autochthonous, are colonists, and their immigration must have been assisted either by storm, or by drifting wreckage used as a refuge, or by human agency. Either one of these, or else the migration occurred at a time when the channel which separates the island from the mainland was much narrower than at present.

A consideration of the soundings of the Santa Barbara Channel might be instructive here, but it would lead us too far afield for our present discussion. The point is that the anatomist unaided is absolutely helpless in trying to answer these questions. He cannot tell whether the Santa Cruz Island Jays are a split-off branch of the mainland stem, resident for a hundred thousand years, or whether they were carried over a few thousand years ago by the Indians. He cannot tell whether they are the motley residue of a familiar traffic between island and shore, which finally ceased only when the channel became too wide to cross conveniently awing, or whether, indeed, the place was peopled by a chance pair blown over in a storm.

At this point the oölogist comes in. He does not pretend to know all about it, but he is able to make a modest contribution to knowledge. At least he feels competent to circumscribe the area of this inquiry. A series of some fifty sets of eggs of the Santa Cruz Island Jay passed in review by the Museum of Comparative Oology shows them to be the most absolutely uniform of any spotted eggs known. The series is practically without deviation as to ground color; and while there is inevitably some difference in the distribution of the spots, there is no substantial deviation in the color of the pigment.

If this series had to be compared with a mainland series, showing also a substantial uniformity, we should be as far at sea as the anatomist; but when we place this series alongside one accumulated on the mainland shore, only twenty-five miles away, we find the most startling contrast. The eggs of *Aphelocoma insularis* are among the most homogeneous known; the eggs of *A. californica* exhibit the highest degree of habitual variation of any passerine species in North America. There can be only one meaning to this. *A. insularis* does not represent a general derivation or stock from the mainland, nor could it have achieved such a uniformity if it had been variously derived. The Santa Cruz Island Jays represent a single Mendelian type accidentally derived from one of the multitudinous strains existent on the mainland. We have in their eggs an example of purest inbreeding, an exact selection; and the birds are in all probability the offspring of a single original pair. There have been

no intrusions or replenishments from the mainland, for the egg-type at least would have "gone to pieces" under the impact of such a strain.

We have denied that there exists upon the mainland, in the case of the California Jay, any recognizable evidence of correlation between variation of eggs and somatic changes in the parents. But that is not to say that such evidence may not exist. For we have already conceded that such evidence of correlation, or at least of concomitant variation, might become instantly manifest under selective breeding. The somatic uniformity of the mainland jay may still represent potential variations now held in stern check by interbreeding. The case of the Santa Cruz Island Jay may represent an accidental release of a tendency toward increase in size, latent but held in leash, in the case of its particular ancestors. This being true, or at least possible, we are not free to ascribe all the evidence of change in *A. insularis* to the slow workings of environmental reaction alone. If we are correct in our surmise that *insularis* is the product of a single pair of birds accidentally or artificially isolated from mainland stock, the distinctions which we observe might have arisen immediately, or within a few hundred years at most. While we do not know even yet what all the geno-dynamic values of the Santa Cruz Island Jay are, we have greatly restricted the field of discussion, and we regard this inquiry as a fair example of the methods and promises of comparative oology.

SIMPLE INSTRUCTIONS FOR THE COLLECTING AND PRESERVATION OF BIRDS' EGGS.

Not all bird-lovers are egg-collectors, but many who lack experience would be glad to retrieve an occasional rarity, in the name of science, if they knew how to proceed. The following suggestions are not meant to be exhaustive, nor are they addressed to "old hands," whether professional or amateur.

The basis of all modern egg collecting is the set, or clutch, which comprises the nestful, or all the eggs which a bird would normally lay for one sitting. Any number less than this is of little or no value, save in the case of extreme rarities.

A set of eggs is of little or no value to science unless it is well collected; that is, that its collecting conforms substantially to the following requirements:

First, that it be **well identified**. The eggs **must not be touched** until the collector is thoroughly satisfied as to the identity of the parent bird, or has secured it.

Second, that the eggs be removed and transported to the work-room under such circumstances, or accompanied by such marks of identification, that there can be **no possible doubt** as to which eggs belong together in one individual set.

Third, that the eggs be **well prepared**. The contents should be **entirely** removed through a single, small, round hole drilled midway on one side (the least showy side), and the inside of the shell thoroughly rinsed with clean water, and dried. Small, inexpensive drills, carefully graded as to size and use, may be obtained of any supply house, or in default of such, a wire nail of suitable size, **perfectly** straight, may be ground or filed to a perfectly rounded taper point, and finished off with a fine file held with the grain. The final furrowed surface of lengthwise grooves, which the drill requires, can be obtained only by pressing the taper point firmly between the file groove until the minute rugosities of the file ridges imbed themselves in the softer steel. These home-made drills are incomparable, and almost obligatory for delicate eggs. The contents of the egg are forced out by a jet of air played through a blow-pipe, held very close to the hole but not in contact with it. Eggs advanced in incubation may require the patient use of delicate instruments, especially an embryo hook and slender-tipped forceps, or, if time allows, the use of digestive fluids, compounds of pepsin, or, in default of these, a saturated solution of cooking soda applied over night.

In case of common eggs, near the hatching point, but necessary for use in series, if time fails, a rougher method may be employed. A rounded hole substantially half the shorter diameter of the egg may be broken out by the skillful use of curve-tipped forceps, and the embryo lifted out. This is contrary to all the books and **very** unprofessional, but we do it under the spur of necessity rather than lose a coveted link in a series.

Attention should be paid to the drainage of the egg, after it has been twice rinsed by water injected, shaken thoroughly, and blown out. The egg should be rested hole down for a few hours on a blotter, or better, an absorbent linen cloth. If, upon examination, it is still "drizzling," apply the blow-pipe for a last toot. When thoroughly drained, turn hole up to dry. Be careful not to leave imperfectly blown eggs long enough to get glued to the drain cloth; but if you are caught, remove the egg only by patient application of water on the opposite side of the cloth.

Fourth, that the eggs be **well marked**. Use the softest pencil obtainable, a "6B" if possible. Use your own system or follow our suggestions (recorded beyond), but **don't** leave unmarked eggs around.